

Public Utility Vehicle Drivers' Perceptions of New Traffic Lights: Satisfaction, Effectiveness, and Safety in Ozamiz City

Joanavic P. Alduhesa^{*}, Ara Mena M. Caramba, Joshua C. Ponce, Russel Jonn M. Palang, Angelita B. Alvarico & Jose F. Cuevas Jr.

Misamis University, College of Criminology, H.T. Feliciano St., Ozamiz City, 7200, Philippines.

Corresponding Author Email: joanavicalduhesa@gmail.com^{*}



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ABSTRACT

This research explored the attitudes of Public Utility Vehicle (PUV) drivers in Ozamiz City towards the recently installed traffic lights based on three aspects: satisfaction, perceived effectiveness, and perceived safety. Utilizing the descriptive-correlational research design, data were collected from 120 randomly chosen PUV drivers using structured questionnaires. Findings showed that drivers had “very high satisfaction” with the traffic lights along several dimensions of traffic flow efficiency, waiting time, convenience, and compliance. Likewise, the system was seen as “very highly effective”, especially in enhancing travel time, alleviating congestion, and facilitating ease of compliance. Furthermore, drivers also viewed the new traffic lights as “very highly safe”, showing high confidence in intersection safety and accident prevention. In spite of these favorable impressions, statistical tests revealed that neither satisfaction nor perceived effectiveness was significantly related to perceived safety. These results indicate that although the new traffic lights increase efficiency and order on the road, drivers' feelings about safety depend upon more global factors than traffic signal operation. The research concludes that long-term optimization of traffic signals, supplemented with road improvements, traffic regulation enforcement, and driver training, is required to ensure effective traffic flow management and improved road safety in Ozamiz City.

Keywords: Driver Behavior; Effectiveness; Ozamiz City; Perceived Safety; Public Utility Vehicle (PUV) Drivers; Satisfaction; Road Safety Perception; Traffic Flow Efficiency; Traffic Lights; Traffic Management.

1. Introduction

Traffic management and road safety are vital for ensuring efficient urban transport and minimizing accidents (Paje et al., 2022; Moreno, 2023). In Ozamiz City, new traffic lights aim to improve traffic flow and safety, particularly for public utility vehicle (PUV) drivers who rely on these systems for daily commuting (Moreno, 2023; Abdelati, 2024; Malasique & Rosete, 2022). Effective traffic light systems regulate vehicle movements, reduce congestion, and enhance safety at intersections (Vieira et al., 2024; Paul et al., 2022; Sakr et al., 2023). PUV drivers' satisfaction depends on traffic flow efficiency, waiting times, convenience, and compliance with traffic rules (De Ocampo & Tanpoco, 2024; Tariq, 2025). Their perceptions of safety improve when traffic lights are properly timed and maintained (Madvari et al., 2023; Siddig, 2022). Conversely, malfunctioning or poorly timed lights can lead to frustration and unsafe driving behavior (Azadani & Boukerche, 2021; Talbot et al., 2023). This study evaluates PUV drivers' satisfaction, perceived effectiveness, and safety concerning the new traffic lights in Ozamiz City. It fills a research gap on traffic management impacts in mid-sized urban areas, guided by the Technology Acceptance Model and Theory of Planned Behavior to explain driver acceptance and compliance (Davis, 1989; Ajzen, 1991). Findings will inform improvements in traffic control systems and policies tailored to local road conditions and user experiences.

1.1. Study Objectives

This research measured the degree of satisfaction, perception of effectiveness, and perceived safety by Public Utility Vehicle (PUV) drivers towards the newly installed traffic lights in Ozamiz City. Specifically, this research performed the following:

1. measured the satisfaction of PUV drivers with traffic flow efficiency, waiting time, convenience, and compliance;
2. determined the perception of PUV drivers towards the efficacy of the recently installed traffic lights in travel time, congestion, and ease of compliance;
3. determined the perceived safety of PUV drivers, focusing on intersection safety confidence and reduction of accidents
4. analyzed the strong relationship between drivers' satisfaction and their perceived safety towards the recently installed traffic lights; and
5. examined the strong relationship between traffic light effectiveness perceived by drivers and their perceived safety in Ozamiz City.

2. Methods

This study utilized a descriptive-correlational design to examine the relationships among satisfaction level, perception of traffic light effectiveness, and perceived safety among PUV drivers regarding newly installed traffic lights in Ozamiz City (Stangor & Walinga, 2014). This design is suitable for exploring associations without implying causation, providing insights to inform traffic management policies. Data were collected from 120 randomly selected PUV drivers frequently using intersections with new traffic lights in Ozamiz City. The setting focused on major roadways with high traffic volumes to capture relevant driver experiences. Three researcher-developed questionnaires were used, each pilot-tested with 20 individuals for clarity and validity: a 20-item Satisfaction Questionnaire, a 15-item Effectiveness Questionnaire, and a 10-item Perceived Safety Questionnaire. Each employed a 4-point Likert scale measuring constructs related to functionality, safety, efficiency, and convenience. Data gathering involved administering the survey to selected PUV drivers at key intersections, ensuring responses reflected firsthand experience with the traffic system. Ethical clearance was secured from the Mayor's Office and Local Government Unit, with assurances of confidentiality and anonymity. Data analysis applied descriptive statistics (mean, standard deviation) to assess satisfaction, effectiveness, and safety levels. Pearson's Product Moment Correlation was used to examine relationships between satisfaction and perceptions of effectiveness and safety, enabling understanding of how these factors interrelate.

3. Results and Discussions

3.1. Satisfaction of PUV Drivers towards the Traffic Lights

The satisfaction of Public Utility Vehicle (PUV) drivers on the recently installed traffic lights indicates their experiences and perceptions of how the latter affects their daily activities. Most of the drivers have stated that the new traffic lights have streamlined traffic flow and minimized traffic congestion in congested intersections, enabling smoother and safer travel through high-traffic zones. This not only helped shorten travel times but also improved road safety, reducing the possibility of accidents (Fisa, R. et al., 2022; Aleko, & Djahel, S., 2020). Some drivers did identify the initial difficulties like adjusting to new signal timings and occasional delays during rush

hours. In general, most PUV drivers appear to welcome the improvement that the traffic lights have introduced, an indication of a good reception and possible future upgrade in traffic management systems.

Table 1. Level of satisfaction of PUV drivers to the newly implemented traffic lights (N=120)

Sub-construct	PUV Drivers' Satisfaction		
	Mean	SD	Remark
Traffic Flow Efficiency Satisfaction	3.66	0.05	Very Highly Satisfied
Waiting Time Satisfaction	3.59	0.02	Very Highly Satisfied
Convenience Satisfaction	3.64	0.03	Very Highly Satisfied
Compliance Satisfaction	3.72	0.01	Very Highly Satisfied

Note: PUV Drivers' Satisfaction Scale: 3.25-4.00 (Very Highly Satisfied); 2.50-3.24 (Highly Satisfied); 1.75-2.49 (Less Satisfied); 1.00-1.74 (Not Satisfied).

Public Utility Vehicle (PUV) drivers' satisfaction with the newly installed traffic lights was measured in four major aspects: Traffic Flow Efficiency, Waiting Time, Convenience, and Compliance. With 120 drivers as the sample size, the findings showed consistently very high satisfaction at mean scores of between 3.59 and 3.72 and very low standard deviations. These improvements, in the opinion of the drivers, have significantly improved traffic flow and reduced waiting times at intersections, which are critical to maintaining efficient operations. The high variability in responses indicates a strong consensus among drivers that these improvements are both noticeable and beneficial.

Aside from increased traffic flow and decreased waiting, drivers also reported high satisfaction with the ease of coping with the new system and traffic rule compliance made possible by the lights. Compliance was the most pronounced satisfaction, indicating that drivers value the contribution of the traffic lights to ordering and safety in driving behavior (Cestac & Carnis, L. 2024; Bei et al., 2024). Overall, the results prove that the new traffic lights have contributed to the benefits of PUV drivers in their everyday lives by enhancing efficiency, convenience, and safety, and proving that the system is widely accepted and functional in responding to their operational requirements.

The reported satisfaction levels by PUV drivers toward the recently installed traffic lights match closely with past research findings on traffic management systems. Research works like those of Hussain et al. (2020); Sieklicka et al (2022), and Dasgupta et al. (2024) proved that improved traffic signals enhance the efficiency in traffic flow and decrease waiting times, which results in greater driver satisfaction. Likewise, the extremely high standard deviations within our research indicate uniform agreement by drivers, which is similar to the consistent positive responses given in these earlier research studies.

Furthermore, the strong satisfaction related to convenience and compliance is consistent with research emphasizing the importance of clear and user-friendly traffic control measures. For example, Tumminello et al.

(2023), Gahletia and Sidhu (2025), and Grobelna et al. (2025) found that well-designed traffic signals not only facilitate smoother driving experiences but also encourage better adherence to traffic rules, thereby enhancing road safety. Our evidence is consistent with this, the highest satisfaction rating being for compliance, demonstrating just how effective traffic lights can be in promoting good driver behavior. The research underlines the accepted knowledge that well-deployed traffic light systems have a positive effect on both operational efficiency and driver satisfaction.

The high satisfaction levels of PUV drivers with the newly installed traffic lights would mean that such traffic management interventions are effective in improving operational efficiency and road safety. These favorable perceptions would mean that sustained investment in optimizing traffic signal systems would result in more smooth traffic flow, shorter waiting times, and higher compliance with traffic rules, ultimately to the benefit of both commuters and drivers (Alshayeb, S. et al., 2022; Musa, A. et al., 2023). Policymakers and transport regulators should consider strengthening and retaining these systems, as well as including driver responses to enhance convenience and efficiency in traffic regulation measures.

3.2. Traffic Signal Effectiveness

The efficiency of traffic signals is extremely important to facilitate smooth traffic movement, minimize congestion, and enhance road safety, particularly in metropolitan cities with high traffic intensity (Subair, S. et al., 2024; Vieira, M. et al., 2024; Elassy, M. et al., 2024). When well-planned and optimally positioned, traffic signals can control the movement of automobiles as well as pedestrians effectively, reducing conflicts at intersections to a bare minimum and ensuring better traffic discipline overall (Gamel S et al., 2022; Tang, E, 2024; Kaul, A., & Altaf, I., 2022). Research has indicated that good traffic signaling decreases travel delays and raises adherence to traffic rules, hence decreasing the chances of accidents (Dewa, 2023; Hosseinian, S. M., & Mirzahosseini, H., 2024). In the case of public utility vehicles (PUVs), efficient traffic lights help in more certain travel times, which is crucial for their day-to-day operations. As proven by the high satisfaction rate of PUV drivers in this research, the present traffic light implementation has been effective in resolving important issues of waiting time, efficiency of flow, and compliance, which shows that such systems are valuable tools for contemporary traffic management..

Table 2. Level of perception of traffic signal effectiveness of PUV drivers to the newly implemented traffic lights (N=120)

Sub-construct	Effectiveness of Traffic Lights		
	Mean	SD	Remark
Impact on Travel Time	3.72	0.01	Very Highly Effective
Impact on Traffic Congestion	3.72	0.04	Very Highly Effective
Ease of Compliance	3.79	0.03	Very Highly Effective

Note: Effectiveness of Traffic Lights Scale: 3.25-4.00 (Very Highly Effective); 2.50-3.24 (Highly Effective); 1.75-2.49 (Less Effective); 1.00-1.74 (Not Effective).

The findings listed in Table 2 indicate that PUV drivers perceive the recently installed traffic lights as very highly effective in all the areas that were assessed. In particular, both the effect on travel time and the effect on traffic congestion scored an average of 3.72 with standard deviations of 0.01 and 0.04, respectively. The results of the study imply that the traffic lights have greatly enhanced the overall convenience of road usage, enabling PUV operators to make rounds with less wastage of time and less stress brought about by congestion. The low range of responses also shows a high level of agreement among drivers, affirming the integrity of the traffic system in controlling high-demand intersections and preventing bottlenecks.

The sub-construct ease of compliance got the highest mean of 3.79 (SD = 0.03), which indicates that drivers not only view the traffic light system as easy to follow but also as conducive to safe and orderly driving behavior. This is even more critical for PUV drivers, whose compliance with traffic rules has a direct impact on commuter safety and road discipline. The high ratings for all sub-constructs indicate the effectiveness of the newly installed traffic lights in solving primary issues of motorists, namely, travel efficiency, traffic congestion management, and rule adherence. The data in general point to the traffic light system as a popular and effective traffic management tool that positively impacts the day-to-day activities of public utility motorists and overall traffic flow within the city.

The findings of this study, which indicate a very high level of perceived effectiveness of the newly implemented traffic lights among PUV drivers, are consistent with several previous studies on traffic signal systems. According to the study, traffic lights that are properly timed and strategically located significantly reduce travel delays and improve driver satisfaction, particularly in urban areas with high traffic volume (Faheem, H.B. et al., 2024; Segun, W.M., et al., 2024). In the same vein, Almatar, K. M. (2024) highlighted that effective traffic signal systems ensure smoother traffic flow, lower travel time, and reduce driver stress. These effects are reflected in the current study, where PUV drivers assessed both travel time impact and traffic congestion as very highly effective. The low standard deviations of the responses also validate the claims that properly designed traffic control systems have consistent experiences for road users, giving rise to wide agreement on their effectiveness. In addition, the strong satisfaction of PUV drivers for ease of compliance is supported by the results of Anilkumar et al. (2025), which emphasized that intuitive and understandable traffic signal systems ensure greater compliance and discourage traffic violations.

Their study pointed out that driving behavior is more compliant when signal systems are fair, visible, and predictable (Azadani, M. N., & Boukerche, A., 2021; Bouhsissin, S. et al., 2023). This is especially so for public utility drivers, who have to constantly drive through multiple stops and traffic situations throughout the day. The high degree of perceived compliance effectiveness in this study indicates that the traffic lights not only enhance operational effectiveness but also encourage safer driving behavior (Watson-Brown, N. et al., 2024; Jegan, J. et al., 2024). These findings complement the general literature calling for modernized, driver-friendly traffic signal systems as an important solution in facilitating road discipline and enhancing urban traffic situations. The findings of this research suggest that the recently introduced traffic light system has had a major positive contribution towards the daily functioning of PUV drivers by enhancing travel time, easing congestion, and increasing traffic rule compliance.

The extremely high perceived effectiveness by all sub-constructs indicates that such systems are not only operationally effective but also are well-accepted by the principal stakeholders in the public transportation sector. These results reinforce the imperative for investment in well-designed and strategically located traffic signals as a method of enhancing urban mobility and road safety. Policy makers and traffic agencies can then utilize these findings to inform the next generation of infrastructure upgrades, so that traffic networks continue to be responsive to drivers' and the public's needs.

3.3. Perceived Safety

The safety perception of PUV drivers is an important factor to consider in assessing the overall quality of traffic management systems, such as recently installed traffic lights (De Ocampo & Tanpoco, 2024; Farooq et al., 2020). In the present research, drivers perceived a high safety level, indicating that the traffic lights have made the movement of motorized vehicles at intersections more orderly and predictable. This is consistent with current literature which identifies that well-placed and highly visible traffic signs can considerably decrease the chances of accidents and enhance the feelings of safety for drivers on the road (Bayouth et al., 2021; Ma et al., 2021). For PUV drivers, whose daily activities consist of many stops and exposure to uncertain traffic conditions, safety is crucial not just for their own well-being but also for the confidence of passengers (Fabella, 2023; Chan et al., 2025). The positive image of safety shows that not only has the new traffic light system enhanced traffic efficiency, but it has also contributed to a safer driving environment, showing the significance of organized traffic control in urban transport planning (Obeidat et al., 2022; Ali et al., 2020; Essa & Sayed, 2020). Table 3 reveals the perceived safety of PUV drivers to the newly installed traffic lights.

Table 3. Level of perceived safety of PUV drivers to the newly implemented traffic lights. (N=120)

Sub-construct	Perceived Safety		
	Mean	SD	Remark
Intersection Safety Confidence	3.79	0.01	Very Highly Safe
Perceived Accident Reduction	3.73	0.05	Very Highly Safe

Note: Effectiveness of Traffic Lights Scale: 3.25-4.00 (Very Highly Safe); 2.50-3.24 (Highly Safe); 1.75-2.49 (Less Safe); 1.00-1.74 (Not Safe).

As indicated in Table 3, drivers of Public Utility Vehicles (PUVs) see an extremely high sense of safety when it comes to the recently installed traffic lights, as both sub-constructs Intersection Safety Confidence and Perceived Accident Reduction were rated very positively. The Intersection Safety Confidence attained the highest mean value of 3.79 with an extremely low standard deviation of 0.01, which shows that almost all respondents believe that intersections are now considerably safer. This attests that the traffic lights were able to coordinate the movement of vehicles and reduce confusion at key points, thus improving drivers' confidence in driving through them (Latif et al., 2025; Wang et al., 2021). This feeling of security is especially important for PUV drivers who

are always driving through high-risk routes and are also subjected to erratic road behaviors during the day (Hussain et al., 2021; Acheampong, 2021).

Also, the sub-construct Perceived Accident Reduction had an average score of 3.73 (SD = 0.05), further solidifying that drivers perceive the new traffic lights help reduce the occurrence of vehicular accidents. While the standard deviation is more elevated compared to intersection safety, it still indicates strong agreement among drivers. These results align with earlier findings showing that signalized intersections significantly reduce collision rates while improving driver attentiveness (Younes et al., 2023; Tomar et al., 2022). The very high perception of safety among PUV drivers not only indicates the operational effectiveness of the traffic lights but also validates wider initiatives to enhance road safety within jam-packed urban areas (Mustapha & Ibitoye, 2022; Bassani et al., 2020). In general, the consistently high safety ratings highlight that the use of organized traffic signaling systems is vital in ensuring a safer and more secure driving environment for public transport operators and commuters (Kan & Das, 2024; Muhammad et al., 2020; Hosseinian & Mirzahosseini, 2024).

The high perception of safety for PUV drivers in this research is corroborated by a number of connected studies that place prime importance on the traffic signals in enhancing road safety. For example, studies have shown that implementing traffic signal systems at hazardous intersections leads to a marked decrease in road accidents and boosts driver confidence, particularly in urban transport settings (Retallack & Ostendorf, 2020; Cohn et al., 2020). In the same vein, previous findings indicate that signalized intersections enhance the predictability of vehicle behavior, which helps reduce accidents and promotes compliance with traffic regulations (Tomar et al., 2022; Zhang & Su, 2021). These observations agree with findings of the current study, where both intersection safety confidence and perceived accident reduction were rated as very safe. The similarity between this research and prior literature supports the inference that properly implemented traffic lights efficiently work towards making the environment for public utility drivers safer, eventually leading to enhanced public transport reliability and road discipline.

The strong perception of safety among PUV drivers implies that the newly implemented traffic lights are effective in creating a safer driving environment, which is crucial for reducing accidents and enhancing overall road safety (Zhou et al., 2023; Elassy et al., 2024). This positive feedback highlights the importance of continuing to invest in and maintain modern traffic control systems that not only improve traffic flow but also boost driver confidence and compliance with traffic regulations. For policymakers and traffic management authorities, these findings suggest that expanding such traffic signal interventions can lead to safer urban transport conditions, benefiting both drivers and passengers. Ultimately, prioritizing safety through effective traffic signaling can contribute to a more reliable and secure public transportation system (Pan et al., 2023; Qadri et al., 2020; Wei et al., 2021).

3.4. Test of significant relationship between the satisfaction and perceived safety of PUV drivers to the newly implemented traffic lights

The test of significant relationship between the satisfaction and perceived safety of PUV drivers to the newly implemented traffic lights implies a moderate positive correlation. Thus, satisfied drivers perceive more safety

with the newly implemented traffic lights. The suggested improvement in the efficiency of traffic flow, waiting time, and convenience implies direct contribution to the safety felt by drivers of these roads. Such results are in line with traffic management literature, which highlights the fact that traffic control measure satisfaction tends to improve compliance and decrease dangerous driving practices. The relationship between satisfaction and perceived safety reinforces the need for the design of traffic systems to achieve not only operational efficiency optimization but also the creation of a safe environment, eventually leading to improved safer driving habits on the part of PUV drivers. Table 4 shows the result of significant relationship between the satisfaction and perceived safety of PUV drivers to the newly installed traffic lights.

Table 4. Significant relationship between the satisfaction and perceived safety of PUV drivers to the newly implemented traffic lights

Variables	<i>r</i> value	<i>p</i> value	Remarks
PUV Drivers' Satisfaction and Perceived safety	0.5	0.95	Not significant

Table 4 presents the analysis of the relationship between PUV drivers' satisfaction and their perceived safety regarding the newly implemented traffic lights. The computed *r*-value of 0.5 indicates a moderate positive correlation between the two variables, suggesting that, to some extent, higher satisfaction with the traffic lights may be associated with increased feelings of safety among drivers. However, the *p*-value of 0.95, which is well above the commonly accepted significance threshold of 0.05, indicates that this observed correlation is not statistically significant. This means that, despite the moderate correlation coefficient, we cannot confidently conclude that satisfaction and perceived safety are meaningfully related in this context based on the current data.

The fact that there is no significant relationship can be attributed to a number of reasons. For example, although drivers would feel mostly satisfied with things like traffic movement and wait time, their perception of safety could be subject to different variables not measured in the measurement of satisfaction, e.g., road condition, other people's behavior behind the wheel, or environmental conditions outside. Also, the fairly high *p*-value might imply that the personal perceptions of safety are more subjective and complex, and not necessarily in a direct relationship with satisfaction with traffic signal performance. This discovery reflects the nuance of driver attitudes and that enhancing satisfaction with traffic infrastructure does not directly correlate with enhanced perceived safety. Therefore, traffic management authorities should consider complementary measures such as enhanced road maintenance, driver education, and enforcement to holistically improve both satisfaction and safety perceptions among PUV drivers.

The absence of significant correlation between satisfaction among PUV drivers and their perceived safety can be interpreted to mean that the two constructs, as much as they are related, can be affected by varying factors and ought to be dealt with independently when formulating traffic management plans. This means that improving satisfaction alone through improved traffic movement or shorter waits may not necessarily translate into improved drivers' perceptions of safety. Traffic authorities and policymakers should thus implement a more integrated

strategy that not only highlights operational efficiency but also aims at safety-specific interventions like better road infrastructure, heavier enforcement of traffic regulations, and awareness campaigns among drivers to better enhance satisfaction and safety perceptions among PUV drivers.

3.5. Test of the significant relationship between the perception of traffic signal effectiveness and perceived safety of PUV drivers to the newly implemented traffic lights

The test of the significant relationship between the perception of traffic signal effectiveness and the perceived safety of PUV drivers to the newly implemented traffic lights highlights the interconnections of these two factors in shaping driver experiences. When drivers perceive traffic signals as effective in managing traffic flow, reducing congestion, and facilitating compliance, they are more likely to feel safe navigating intersections and busy roadways. This correlation underscores that effective traffic signals not only enhance operational efficiency but also contribute significantly to drivers' confidence and sense of security on the road. The relationship aligns with previous research indicating that well-functioning traffic control systems can reduce accidents and improve driver behavior by creating predictable and orderly traffic environments. Consequently, improving the effectiveness of traffic signals can be seen as a critical step toward fostering both safer and more satisfactory driving conditions for PUV operators. Table 5 presents the results of the significant relationship between the perception of traffic signal effectiveness and perceived safety of PUV drivers to the newly implemented traffic lights.

Table 5. Significant relationship between the perception of traffic signal effectiveness and perceived safety of PUV drivers to the newly implemented traffic lights

Variables	<i>r</i> value	<i>p</i> value	Remarks
Effectiveness of Traffic Lights and Perceived safety	-0.054	0.6	Not significant

Table 5 presents the analysis of the relationship between PUV drivers' perception of traffic signal effectiveness and their perceived safety following the implementation of the new traffic lights. The computed *r*-value of -0.054 suggests a very weak negative correlation between the two variables, indicating that there is essentially no meaningful linear association between how effective drivers perceive the traffic signals to be and how safe they feel. Moreover, the *p*-value of 0.6 is substantially higher than the standard significance level of 0.05, leading to the conclusion that this relationship is statistically not significant. In other words, the data does not support the idea that perceptions of traffic signal effectiveness directly influence drivers' feelings of safety in this context.

This lack of a significant relationship might reflect the complex nature of perceived safety, which is often influenced by multiple factors beyond the perceived operational effectiveness of traffic signals alone. For instance, the perceived safety might be impacted by the driver's behavior, road conditions, visibility, enforcement of the traffic laws, and environmental factors that may not necessarily be related to the lights themselves. Similarly, one might value the time or convenience that the signals provide without considering himself or herself safer because the perceptions of safety are indeed subjective and multi-dimensional. These findings highlight the need for a more holistic approach to improving road safety that combines effective traffic management with other safety measures,

such as public awareness campaigns, improved infrastructure, and strict enforcement, to better address drivers' safety concerns.

The finding of no significant relationship between the perception of traffic signal effectiveness and perceived safety implies that improving traffic signal functionality alone may not be sufficient to enhance drivers' sense of safety. This indicates that although effective traffic light systems may optimize traffic flow and alleviate congestion, drivers' sense of safety is most probably determined by a whole host of other factors, including road conditions, driving behavior, and traffic rule enforcement. Therefore, traffic management efforts should adopt a more comprehensive strategy that integrates effective signal systems with other safety interventions, including infrastructure improvements and driver education, to holistically improve both the efficiency and safety of the road environment for PUV drivers.

4. Conclusion

The study found that PUV drivers in Ozamiz City generally express high satisfaction and perceive the new traffic lights as effective and safe. However, statistical analysis showed no significant link between satisfaction or perceived effectiveness and perceptions of safety. This indicates that drivers' safety perceptions are influenced by a broader set of factors, highlighting the need for a comprehensive approach that includes infrastructure, driver behavior, enforcement, and environmental conditions to improve road safety.

4.1. Future Suggestions

1. Investigate the long-term effects of optimized traffic signal timing combined with road infrastructure improvements on both driver satisfaction and traffic safety in mid-sized urban cities.
2. Explore the role of advanced adaptive traffic light systems using real-time data and AI technologies in enhancing traffic flow efficiency and perceived safety among PUV drivers.
3. Study the impact of driver training programs focused on traffic signal compliance on improving road safety and operational efficiency for PUV drivers.
4. Assess the influence of social and environmental factors on PUV drivers' perception of safety, beyond the functionality of traffic signal systems, to develop holistic traffic management interventions.
5. Conduct comparative research between large metropolitan and mid-sized urban areas like Ozamiz City to understand geographical and contextual variations in PUV driver attitudes toward traffic control systems.

5. Recommendations

Traffic management agencies should continue enhancing traffic light systems to maintain satisfaction and operational efficiency. To effectively improve perceived safety, an integrated strategy is essential. This includes upgrading infrastructure, strengthening traffic law enforcement, and implementing targeted driver education and awareness campaigns on safe driving practices. Establishing regular feedback mechanisms with PUV drivers will help identify safety issues beyond traffic light performance. Such coordinated efforts can foster a safer, more efficient urban traffic environment that addresses both functional and psychological needs of PUV drivers.

Declarations

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Competing Interests Statement

The authors declare that they have no competing interests related to this work.

Consent for publication

The authors declare that they consented to the publication of this study.

Authors' contributions

All the authors took part in literature review, analysis, and manuscript writing equally.

Availability of data and materials

Supplementary information is available from the authors upon reasonable request.

Institutional Review Board Statement

Not applicable for this study.

Informed Consent

Informed consent was obtained from all participants before the commencement of the study.

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